

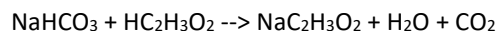
## Percent Baking Soda in a Mixture

### Your Tasks (Mark these off as you go)

- ☐ Review the reaction
- ☐ Write a procedure to determine the amount of sodium bicarbonate in a mixture of sodium bicarbonate and sodium chloride
- ☐ Collect your data
- ☐ Analyze your data
- ☐ Interpret your results
- ☐ Receive credit for this lab

### ☐ Review the reaction

The formal name for baking soda is sodium bicarbonate. The formal name for vinegar is acetic acid. Sodium bicarbonate ( $\text{NaHCO}_3$ ) and acetic acid ( $\text{HC}_2\text{H}_3\text{O}_2$ ) react accordingly,



Notice that as the reaction proceeds carbon dioxide gas is produced.

Inspect the reaction above. If you started with 10 g of sodium bicarbonate and 10 g of vinegar. Would the reaction weigh more or less at the end? Explain.

If you had 4 moles of sodium bicarbonate and 10 moles of acetic acid.

- (a) How much  $\text{CO}_2$  gas could you make
- (b) What is the limiting reactant.

If, in a certain reaction you produced 0.5 moles of  $\text{CO}_2$ . How much sodium bicarbonate did you start with?

□ **Write a procedure to determine the amount of sodium bicarbonate in a mixture of sodium bicarbonate and sodium chloride**

Your task for this lab is to determine the percentage of sodium bicarbonate ( $\text{NaHCO}_3$ ) in a mixture of sodium bicarbonate ( $\text{NaHCO}_3$ ) and sodium chloride ( $\text{NaCl}$ ).

Sodium bicarbonate reacts with acetic acid and sodium chloride does not, we can therefore use the amount of carbon dioxide produced to figure out how much sodium bicarbonate was in the original mixture.

Using the materials you have been provided devise a procedure that will enable you to figure out how much sodium bicarbonate is in a mixture of sodium chloride and sodium bicarbonate. You will be provided an 4 gram sample of the mixture. Your procedure must account for the following,

- How do you know if you added enough acetic acid? If you do not add enough, not all of the sodium bicarbonate will react. You need the acetic acid to be the *excess* reactant.
- How do you know if the reaction is complete?
- How do you know that all the carbon dioxide has left the mixture? Carbon dioxide is soluble in water and you will also notice bubbles in your mixture, even after the reaction has appeared to be complete.

Write your procedure below. Your procedure must be clear and concise and written in a manner that one of your peers could repeat it and obtain similar results.

### □ Collect your data

You must repeat the procedure you devised at least TWO times. In the space below, create a data table for organizing your data. You will be graded on the clarity and organization of your data.

In the space below, list any observations that you think might contribute to your results not being as accurate as they should be. For example, do you see bubbles trapped in the final solution?

## □ Analyze your data

For each trial, indicate the mass of carbon dioxide ( $\text{CO}_2$ ) that evolved.

Now that you know the mass of  $\text{CO}_2$  released during the reaction, use this mass to calculate the grams of sodium bicarbonate ( $\text{NaHCO}_3$ ) in the original mixture. Do this for both trials. Each calculation must show the correct set up, be rounded to an appropriate number of significant figures, and include units.

Now that you know the mass of sodium bicarbonate ( $\text{NaHCO}_3$ ), calculate the percentage of the sodium bicarbonate ( $\text{NaHCO}_3$ ) in the original mixture. Do this for both trials.

## □ Interpret your results

Answer the following in complete sentences. You must also be mindful of spelling, punctuation and overall writing quality.

What was the purpose of this experiment?

In your own words, summarize what you did in order to accomplish the purpose.

Summarize your findings. In your summary you must include values you obtained.

Identify two sources of error

Error	Major or minor	Effect on reported percentage

## □ Receive Credit for this lab

Each group member must complete and submit their own lab to receive credit